

STUDIES IN THE GENERA OF THE *DIOSMEAE* (RUTACEAE): 11. A REVIEW OF THE GENUS *MACROSTYLIS*

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ABSTRACT

The ten species belonging to the genus *Macrostylis* Bartl. & Wendl. are listed with diagnoses and keys. Species not recently published are described from fresh material with up-to-date distribution maps and with lists of specimens examined.

UITTREKSEL

STUDIES IN DIE GENERA VAN DIE *DIOSMEAE* (RUTACEAE): 11. 'N OORSIG VAN DIE GENUS *MACROSTYLIS*

Die tien soorte van die geslag *Macrostylis* Bartl. & Wendl. met diagnose en sleutels word gekatalogiseer. Soorte nie onlangs gepubliseer nie word van vars materiaal beskryf, met die jongste verspreidingskaarte en met 'n lys van die soorte ondersoek.

HISTORICAL BACKGROUND

The generic name *Macrostylis*, meaning large or lengthy style, was proposed by Bartling & Wendland in their revision of the *Diosmeae* published in 1824. Of the four species enumerated by them, *M. barbiger* and *M. squarrosa* have been maintained, *M. lanceolata* has been placed in synonymy under *M. villosa* (Thunb.) Sonder and *M. obtusa* in synonymy under *M. squarrosa*.

Sonder in his revision of the Rutaceae for the *Flora Capensis* (1860) recognised eight species in the genus *Macrostylis* two of which, as mentioned above, had been previously published. He validated three manuscript names, *M. decipiens*, *M. tenuis* and *M. hirta* of E. Meyer published in Drège's *Zwei Pflanzengeographische Documente* (1844), made the new combination *M. villosa* (Thunb.) Sonder, and proposed two new names *M. crassifolia* and *M. ovata*. Of these *M. crassifolia* has been maintained and *M. ovata*, based on a single fragment collected by Niven, has been considered to be conspecific with *M. tenuis*, a very variable species.

As mentioned under *Euchaetis* (Williams, Jl S. Afr. Bot. 47: 1981) *E. dubia* Sond. was transferred to *Macrostylis* under the name *M. cassiopoides* (Turcz.) Williams. The name *M. cauliflora* Williams, for a small plant from the Bredasdorp Division, was published in the *Journal of South African Botany* (1975) bringing the total number of species recognised in the genus to ten.

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Two species have been excluded. They are *M. cordata* G. Don and *M. pater-soniae* Schonland.

GENERIC DESCRIPTION

Macrostylis Bartl. & Wendl. *Diosmeae* in Beitr. Bot. 1: 191 (1824); A. Juss. in Mém. Mus. Hist. Nat., Paris 13: 476 (1825); Don, Gard. and Bot. 1: 789 (1831); Eckl. & Zeyh., Enum. Plant.: 104 (1835); Endl., Gen. Plant. 2: 1158 (1840); Lindl., Veg. Kingd.: 471 (1853); Sond. in Flor. Cap. 1: 439 (1860); Benth. & Hook., Gen. Plant. 1: 289 (1862–1867); Engl., Pflanzenfam. 19a: 276 (1931); Dyer, Gen. S. Afr. Flow. Pl. 1: 292 (1975). Type species: *M. barbiger*a (L.f.) Bartl. & Wendl. *Diosma* L.f. Suppl. Plant.: 155 (1781).

Shrubs 0.2–1.5 m tall, usually about 0.3 m, often forming a dense bush light green in colour, either arising from a single stem at base or with several stems coppicing after fires.

Branches short, slender, erect or variously bent, glabrescent. *Branchlets* short, slender, often puberulous. *Leaves* 2–13 mm long, subulate, lanceolate, ovate, elliptic, or cordate, adpressed or spreading, usually alternate, in one case only opposite, ciliate, ciliolate or eciliate, sessile or in one case only (*M. villosa*) with a very short petiole. *Inflorescence* terminal, 1–14 aggregate, usually 5–8 aggregate, in one case (*M. barbiger*a) pedunculate; *flowers* white or creamy-white, very small, subtended by one bract and two bracteoles, usually sessile. *Calyx* five-lobed, persisting if fertile. *Petals* crisp-bearded about the middle, sometimes sparsely ciliate towards the middle at the sides. *Staminodes* five, vestigial, in one case only (*M. cassiopoides*) as much as 0.7 mm long. *Filaments* five, becoming 3 to 9 mm long, carrying the spent anthers beyond the petals,

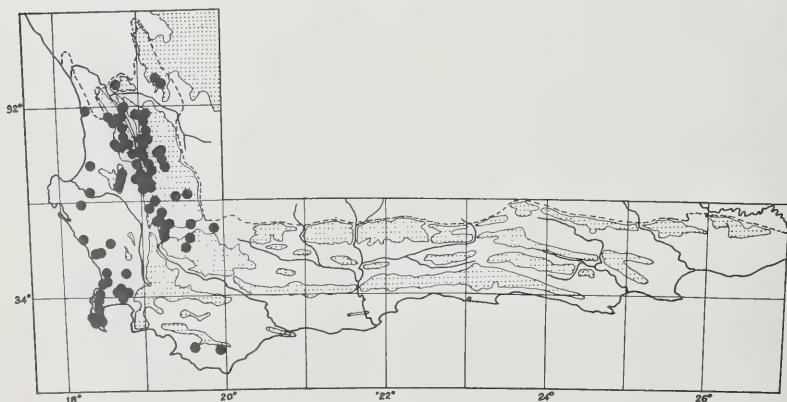


FIG. 1.
Distribution of the genus *Macrostylis*.

glabrous. *Anthers* five, dorsifixed; apical gland globose, minute, usually sessile. *Pollen* 44–63 μ long, 18–30 μ broad, ellipsoid, sticky, triporate. *Disc* envelops the ovary, nectariferous. *Stigma* simple or in two cases (*M. cassiopoides* and *M. cauliflora*) capitellate. *Style* becoming 3.5–9 mm long, usually exceeding the petals by a long way, glabrous, filiform. *Ovary* usually 3-carpellate, in 2 species 3 or 4-carpellate and in one species 2–3 carpellate, 0.5–0.8 mm long, 0.4–0.7 mm diam., glabrous. *Fruit* normally 3-carpellate with only 1 or 2 developing; in *M. cassiopoides* and *M. hirta* 3 or 4-carpellate and in *M. tenuis* 2 or 3-carpellate; *horns* 3–5 mm long except for *M. cassiopoides* where 1.5 mm long and *M. cauliflora* where 2 mm long. *Seed* 5–7.6 mm long, including the white aril adjacent to the truncated apex, 1.8–2.5 mm broad, black, mottled, matt except in the case of *M. cassiopoides* where black, shining.

Characters which definitely place a plant in the genus *Macrostylis* are: fruit apocarpous; flowers complete; petals crisp-bearded beyond which the filaments and style ultimately protrude; filaments and style glabrous and lengthening greatly; anthers with a very small, usually globose, apical gland; staminodes vestigial, in one case only 0.7 mm long; disc closing over the ovary to the base of the style; ovary 2, 3 or 4-carpellate.

It should be noted that the beard on the petals in *Macrostylis* consists of a patch of crisped pubescence about the middle of the petal. *Euchaetis* is the only other genus with characteristically bearded petals. Here however the beard is in the form of a transverse fringe of hairs which together with the ciliate margins on the petals form a cage beyond which the stigma and anthers never protrude.

DISTRIBUTION

The genus *Macrostylis* is found only in the South Western Cape, approximately to the west of 20° longitude; i.e. from Bredasdorp in the east to the Atlantic coast in the west and from near Elim and Bredasdorp in the south to Lokenberg and the Giftberg in the north near Vanrhynsdorp. A discontinuity of about 135 km exists between populations found on the Cape Flats and those in the Bredasdorp Division.

KEY TO SPECIES OF *MACROSTYLIS*

1	Stigma capitellate, 0.3–0.4 mm in diam.	2
1 ⁺	Stigma simple	3
2	Leaves 5 mm long, lanceolate, acute	1. <i>cassiopoides</i>
2 ⁺	Leaves 2.5 mm long, elliptic, obtuse	6. <i>cauliflora</i>
3	Leaves lanceolate or subulate, acute	4
3 ⁺	Leaves elliptic, ovate or oblong, obtuse, subacute or cuspidate	6
4	Leaves lanceolate, acute, apex truncate	5
4 ⁺	Leaves subulate, acute, apex blunt and hairy	3. <i>ramulosa</i>
5	Leaves 4–13 mm long	2. <i>villosa</i>
5 ⁺	Leaves 4–6 mm long	4. <i>decipiens</i>
6	Leaves elliptic, obtuse	7

- 6⁺ Leaves ovate, oblong-ovate, cordate, obtuse sub-acute or cuspidate 8
 7 Leaves adpressed, thin at base, margins serrulate and narrowly cartilagenous 5. *tenuis*
 7⁺ Leaves spreading, thick at base, margins thick midrib broad and prominent 8. *crassifolia*
 8 Leaves ovate or oblong-ovate, obtuse 9
 8⁺ Leaves ovate, sub-acute or cuspidate 10
 9 Leaves strongly recurved, fruit 3-carpellate 7. *squarrosa*
 9⁺ Leaves not strongly recurved, fruit often 2-carpellate 5. *tenuis*
 10 Leaves 6–12 mm long, ovate, cordate, cuspidate 10. *barbigera*
 10⁺ Leaves less than 6 mm long, ovate, cordate sub-acute 9. *hirta*

1. *Macrostylis cassiopoides* (Turcz.) Williams in Jl S. Afr. Bot. 47 (2): 192 (1981).

Acmadenia cassiopoides Turcz. in Bull. Soc. Imp. Nat. Mosc. 31.1: 439 (1858). Type: Lang Valley, Zeyher 291 (BM, G, K, LD, MEL, P, PRE, S, SAM, W). The whereabouts of the specimen seen by Turczaninov is unknown.

Euchaetis dubia Sond. in Flor. Cap. 1: 373 (1860). Type: as above.

Euchaetis dubia Sond. var *pauciflora* Sond. in Flor. Cap. 1: 373 (1860). Type: Ratelklip, alt. 2, June. Zeyher 292 (G, K, MEL, P, PRE, SAM).

Macrostylis dubia Benth. and Hook. Gen. Plant. 1: 289 (1862–1867) nom. nud.

Shrubs up to 1.5 m tall, erect, slender, single-stemmed at base with a long tap root. *Branches* erect, slender, becoming leafless, glabrous with a finely roughened grey bark. *Branchlets* numerous, erect, very slender, dichotomous, glabrous, well clothed with leaves. *Leaves* up to 7 mm long on healthy young plants, otherwise 3–5 mm long, 1.2–1.3 mm broad, lanceolate, sub-acute with a blunt point, glabrous, adpressed, erect, longer than the internodes, imbricate on new shoots, sessile-decurrent, alternate; adaxial surface concave, waxy; abaxial surface convex with scattered gland dots, sub-sabrid with minute white glands; margins narrowly cartilagenous, sparsely ciliate towards the base. *Inflorescence* terminal, 1–5 aggregate, sessile. *Bract* 1.7 mm long, 1.2 mm broad, oblong, obtuse with a blunt reddened tip; margins broadly translucent, densely ciliate; midrib thickened, glabrous, gland-dotted; adaxial surface concave, pubescent in the upper half towards the middle. *Bracteoles* two, 1.8–2.0 mm long, 1 mm broad, elliptic, narrowed at the base, obtuse; midrib thickened, glabrous, gland-dotted with a blunt tip; margins broadly translucent, densely ciliate; adaxial surface concave, sparsely pubescent in the upper half towards the middle. *Calyx lobes* five, 2 mm long, 1.8 mm broad, orbicular; margins broadly translucent, ciliate; abaxial surface glabrous with the midrib somewhat reddened, gland-dotted; adaxial surface concave, densely pubescent towards the centre in the upper two thirds. *Petals* five, 4 mm long overall, white; *limb* 1.4 mm diam., orbicular, margin irregular in outline; *claw* 2.6 mm long, 1.1 mm broad, densely bearded mainly down the midrib, crisped ciliate above. *Staminodes* five, 0.6–0.7

mm long, glabrous. *Filaments* five, becoming 3 mm long, glabrous. *Anthers* 1.1 mm long, 0.7 mm broad, reddened; apical gland 0.3 mm long, short-stipitate. *Pollen* 60 μ long, 25–27 μ broad, elliptic or oblong. *Disc* closes over the ovary clasping the style, smooth, green, exudes nectar from pores on the domed surface. *Stigma* 0.4 mm diam., capitate, green. *Style* 0.4 mm diam. at first, becoming 3.5 mm long, exceeding the beards of the petals, glabrous, erect, persisting. *Ovary* 0.8 mm long, 0.7 mm diam., tri-carpellate, glabrous. *Fruit* 3 or rarely 4-carpellate, 8–8.5 mm long, brownish-red, pitted with gland dots, horns very short, erect, emarginate. *Seed* 5.5 mm long including the white aril, 1.8 mm broad, black, shining.

In proposing the name *E. dubia*, Sonder was apparently unaware of the prior publication of the name *Acmadenia cassiopoides* by Turczaninov in 1858. Sonder remarked that his *Euchaetis dubia* was "a doubtful member of the present genus, approaching *Macrostylis*, in the stamens, the style not elongating, nor more slender at the base, and in the capitate stigma". From the poor quality of the material available it could not be seen that the style does in fact elongate and that the filaments also thrust the spent anthers beyond the petals at the sides.

Turczaninov who worked upon the same collection, containing immature flowers (Zeyher 291), also could not observe that the style might lengthen and,

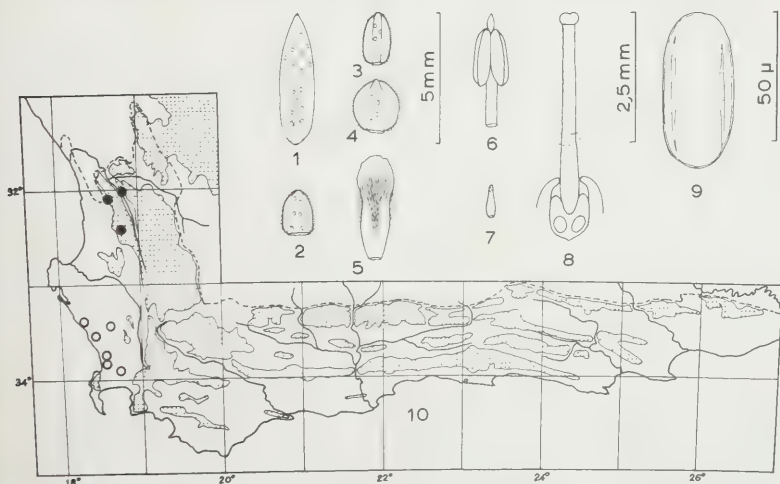


FIG. 2.

Macrostylis cassiopoides: 1, leaf. 2, bract. 3, bracteole. 4, calyx lobe. 5, petal. 6, anther. 7, staminode. 8, gynoecium and disc. 9, pollen. 10, distribution: open circles: subspecies *dregeana*.

noting the presence of staminodes, placed it in the genus *Acmadenia* remarking "Stamens not projecting, the sterile filaments without glands as long as the fertile."

In assigning this species to the genus *Macrostylis* the following characters are taken into account:—1) the beard on the petal is not strictly a transverse beard but also very broad running up and down the petal; 2) the style and filaments eventually become sufficiently lengthened to place the stigma and anthers above the beard equalling the tips of the petals; 3) the disc closes over the ovary encircling the base of the style. The above description made from fresh material, collected from near the type locality (Williams 2011), amplifies those previously published.

SPECIMENS EXAMINED

CAPE—3218 (Clanwilliam): in arenosis ad Langvallei, Clanwilliam Division, -/1/-, Zeyher 291 (BM, G, K, LD, MEL, P, PRE, S, SAM, W); ad Ratelklip in arenosis, -/6/-, Zeyher 292 (G, K, MEL, P, PRE, S, SAM); Nardouw Kloof, Clanwilliam Division (-BB), -/9/1947, *Stokoe s.n.* (SAM 64146); Sandy uplands N. of Paliesheuwel between Bergvallei and Langvallei, Clanwilliam Division (-BD), 23/9/1934, *Acock* 2923 (S); Bergvalley/Swartbaskraal boundary, 3 km E. of Main Road, 1 300 ft., 11/7/1975, *Williams* 2011 (NBG), 16/11/1977, *Williams* 2396 (NBG).

DISTRIBUTION

Macrostylis cassiopoides subsp. *cassiopoides* appears to be extremely rare having been very seldom collected and then only in four localities. The two localities, Nardouws Kloof and Bergvalley, are about 45 km apart in a north-south direction. Still further to the south, after a discontinuity of about 112 km, one begins to find populations of *M. cassiopoides* subsp. *dregeana* which once extended from near Darling southwards to Stickland near Bellville. This subspecies has also been very seldom collected. The fact that the plants are very slender and diffuse with very insignificant flowers may help to explain this apparent appearance of rarity. Miss E. Esterhuysen (32583) reported seeing it for 20 miles, wherever the fynbos had not been disturbed, along the main road to Malmesbury.

Macrostylis cassiopoides subsp. *cassiopoides* is recognised as distinct being a slender shrub up to 1.5 m tall single-stemmed at base, with branchlets glabrous and leaves closely adpressed, with staminodes, 0.6 mm long, having the anther with a small stalked apical gland, the stigma 0.4 mm diam., capitate, and the fruit 3 or 4-carpellate with short horns. It differs from subsp. *dregeana* which has branchlets puberulous, leaves ciliate with a broader hyaline margin, petals with a narrow blade, staminodes 0.4 mm long and the anther with a much smaller apical gland.

4a. *Macrostylis cassiopoides* subsp. *dregeana* (Sond.) Williams, stat. nov. et comb. nov. Type: between Paardeneiland, Blauwberg and Tygerberg, sandy plain, below 500 ft., May to Aug., *Drège 7111* (S, lectotype; MEL, isolectotype).

Euchaetis dubia var. *dregeana* Sond. in Flor. Cap. 1: 373 (1860). Type: as above.

Shrubs up to 0,7 m tall, erect, slender, single-stemmed at base. *Branches* erect, slender, glabrous, fairly smooth, dichotomous. *Branchlets* erect, very slender, puberulous, densely clothed with leaves. *Leaves* about 5 mm long, 1 mm broad, lanceolate, glabrous, adpressed, clasping, erect, sessile, somewhat decurrent, normally alternate; apex sub-acute, callused; margins narrowly translucent, ciliolate at first; adaxially concave with waxy glands; abaxially convex, gland-dotted. *Inflorescence* terminal, 4-aggregate, sessile. *Bract* 2,3 mm long, 1,3 mm broad, broadly lanceolate, glabrous; apex with a blunt callus; margins ciliolate, translucent; adaxially sparsely pubescent. *Bracteoles* two, 2 mm long, 0,8 mm broad, asymmetrically lanceolate, glabrous; apex callused; margins densely ciliolate, translucent; adaxially pubescent. *Calyx lobes* five, 2,3 mm long, 1,7 mm broad, ovate, glabrous, apex thickened, obtuse; margins broadly translucent, ciliolate; adaxially pubescent. *Petals* five, 3,3 mm long; limb 1,2 mm broad; claw 0,8 mm broad, very densely bearded above and on the upper part of the midrib, ciliate above. *Staminodes* five, 0,4 mm long, clavate. *Filaments* five, becoming 2 mm long and carrying the spent anthers outside the petals, glabrous. *Anthers* five, 1 mm long, 0,5 mm broad, yellow; apical gland globose 0,1 mm diam. *Pollen* 43 μ long, 22 μ broad, oblong. *Disc* closes over the ovary, exudes nectar. *Stigma* 0,3 mm diam., capitellate. *Style* becoming 2 mm long, glabrous, erect, persisting. *Ovary* 4-carpellate, 0,5 mm diam., glabrous. *Fruit* 4-carpellate, 6 mm long, 4 mm diam., glabrous; horns 1,5 mm long, emarginate, erect. *Seed* 4–4,5 mm long, 1,5 mm broad, black, shining.

In his *Zwei Pflanzengeographische Documente* (1844) Drège placed his number 7111 under *Agathosma* and, no doubt, distributed duplicates to herbaria which have escaped the notice of the author. The specimens cited above were both from Sonder's herbarium and were seen by him. The above description, which amplifies that of Sonder, was done from fresh material (*Williams 1746*).

SPECIMENS EXAMINED

—3318 (Cape Town): Lay by 3,4 km S. of Ysterfontein Road on new road to Saldanha Bay, Malmesbury Division (–AD), 280 ft., 6/2/1977, *Williams 2410* (NBG); Preekstool, Malmesbury Division (–BC), 8/4/1976, *Esterhuysen 34234* (BOL); Mamre Flats, Malmesbury Division (–CB), –/3/1940, *Penfold 245* (NBG); along the old road from Cape Town to Malmesbury near the turn off to Mamre, Cape Division (–DC), 11/11/1970, *Esterhuysen 32530* (BOL); National Road to Malmesbury at junction with Darling Road, 17 miles from Cape Town,

Cape/Malmesbury Division, 230 ft., 17/1/1973, *Williams 1746* (NBG); near Bothasig along the road to Malmesbury, Cape Division, 19/3/1971, *Esterhuysen 32583* (BOL); Monte Vista, Cape Division, 20/10/1965, *Esterhuysen 31300* (BOL); Flats near Stickland, Cape Division, 30/3/1933, *Acock s.n.* (SAM).

2. *Macrostylis villosa* (Thunb.) Sonder subsp. ***villosa*** in Flor. Cap. **1**: 439 (1860). Type: *Diosma villosa*. α . 146 *Thunberg s.n.* (UPS-THUNB 5724, holotype; LINN 270/20, S, isotypes).

Diosma villosa Thunb. Prodr. Plant. Cap.: 43 (1974). Type: as above.

Macrostylis villosa (Thunb.) Sond. var *B. glabrata* Sonder loc. sit. Type: includes *M. lanceolata* Bartl. & Wendl.

Macrostylis lanceolata Bartling & Wendland, Diosmeae in Beitr. Bot. **1**: 194 (1824) excl. syns. Type: Habitat in Africa maxime australi. *Hesse s.n.* (G, GOET-W)

Macrostylis sieberi? Turcz. in Bull. Soc. Imp. Nat. Mosc. **31**: 1: 439 (1858). Type: Inter planta Siberianas absque schedula. (Note: the only species of *Macrostylis* collected by Sieber at (W) Vienna is *M. villosa*).

Macrostylis barbata St Hil. ex Steud Nom. Bot. Ed 2. **2**: 89 (1841) nom. nud.

Not *Agathosma barbatum* Spreng. pugill. **1**: 20 (1813) which is *Agathosma*.

Not *Bucco barbata* Roem. et Schult. Syst. Veg. **5**: 445 (1819). which is *Agathosma*.

Shrubs about 0,3 m tall with several stems arising from a stout woody underground rootstock. *Stems* erect, slender, glabrous. *Branchlets* erect, slender, short, somewhat reddened, puberulous, well-clothed with leaves. *Leaves* 4–13 mm long, 2 mm broad, lanceolate, acute, rounded and short-petiolate at the base, erect, crowded, somewhat imbricate, alternate; apex triquetrous, somewhat truncate; adaxially flattish, glabrous; abaxial surface glabrous or pubescent with a prominent gland-dotted midrib; margins quite thick, eciliate or crisped ciliate, gland-dotted. *Inflorescence* terminal, umbellate-capitate, 11–14 flowered; buds pink; petals white, spreading, conspicuous. *Bract* one per flower, outermost leaflike, inner much reduced, 1,5 mm long, 0,6 mm broad, lanceolate, glabrous or crisped pubescent; apex truncate; margins sparsely ciliate or crisped ciliate. *Bracteoles* two at the base of the pedicel, 1 mm long, 0,7 mm wide, ovate, ciliate; margins translucent; midrib thickened. *Pedicel* about 2 mm long, glabrous. *Calyx lobes* five, 1,8–2,7 mm long, 1 mm broad, lanceolate; apex truncate; midrib prominent, glabrous or crisped pubescent; margins translucent, ciliate. *Petals* five, 5,8 mm long overall; *limb* 1,6 mm broad, irregularly orbicular, recurved; *claw* 1,2 mm broad, narrowing below, eciliate, strongly crisp-bearded above becoming shorter pubescent below. *Staminalodes* five, 0,15 mm long, a minute scale against the outside of the disc at the base of the petal. *Filaments* five, becoming 9 mm long, glabrous, exerted. *Anthers* five, before anthesis 1,3 mm long, 0,7 mm broad, reddened; apical

gland globose, minute. Pollen $56\ \mu$ long, $25\ \mu$ diam., oblong. Disc closed over the ovary, bright green, exudes nectar. Stigma $0.2\ \text{mm}$ diam., globose, capitate. Style becoming $10\ \text{mm}$ long, glabrous, very slightly narrowed below. Ovary 3-carpellate, $0.7\ \text{mm}$ diam., glabrous. Fruit 3-carpellate, only one or two may develop, about $13\ \text{mm}$ long overall including the pedicel $1\ \text{mm}$ long, glabrous, green or tinged with purple; horn $4\text{--}5\ \text{mm}$ long, erect. Seed $4.5\text{--}6\ \text{mm}$ long with the white aril extending a further $1.5\ \text{mm}$ at the apex, black, matt, mottled.

C. P. Thunberg collected this plant at the Cape round about 1772–1773 and a specimen labelled *Diosma villosa*. α . is preserved with his herbarium at Upsala. A brief description given by Thunberg in his *Prodromus* (1794) clearly refers to this plant. Under his supervision one of his students C. J. Pentz produced the *Dissertatio de Diosma* in 1797 in which he enlarged upon the brief diagnoses previously published by Thunberg. Referring to *Diosma villosa*, part of his description states *Nectaria quinque, barbata* (= Stamines five, bearded). As this specimen has virtually no stamines, Pentz may have mistaken its petals for stamines or he may have been looking at some other plant. Although his error has no bearing on the validity of the name *M. villosa* (Thunb.) Sond. it may later have affected the thinking of others. For example Bartling & Wendland from this description placed *D. villosa* Thunb. doubtfully in synonymy with *Adenandra villosa*. Apparently they had not seen Thunberg's specimen.

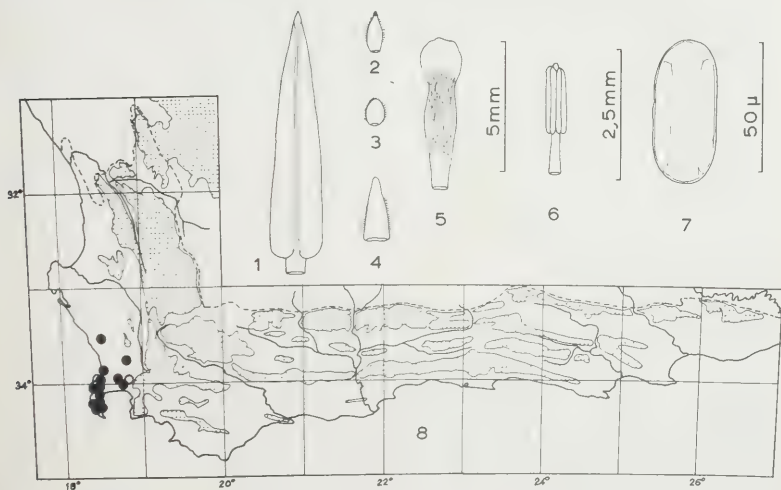


FIG. 3.

Macrostylis villosa: 1, leaf. 2, bract. 3, bracteole. 4, calyx lobe. 5, petal. 6, anther. 7, pollen. 8, distribution; open circle: subspecies *minor*.

Sprengel (1813), without citing a type, named a plant *Agathosma barbatum* the identity of which can not easily be determined because Halle, where Sprengel worked, is now in East Germany. However as he mentions in his description that it has glabrous petals and bearded staminodes there can be no doubt at all that he refers to some species of *Agathosma* and not to a species of *Macrostylis* all of which have bearded petals and virtually no staminodes. Roemer & Schultes (1819) transferred this species to the genus *Bucco* as *Bucco barbata*; *Bucco* being a synonym for *Agathosma*. When Bartling and Wendland (1824) proposed the name *Macrostylis lanceolata* they, apparently in error, cited *Agathosma barbatum* and *Bucco barbata* as synonyms.

Sonder, having seen the specimens in Thunberg's herbarium, was in no doubt that *M. villosa* (Thunb.) Sond. was the correct name for this plant and placed *M. lanceolata* B. & W. in synonymy with his var. β . *glabrata*. However he still seemed quite happy to keep *Agathosma barbata* Spreng. and *Bucco barbata* R. & S. in synonymy with his *M. villosa*. This probably led Pillans (1950) to equate *Agathosma barbata* Spreng. with *M. villosa* Sond. which error is perpetuated by Strid (1972) who stated that *Diosma villosa* α & β in Thunberg's herbarium is a species of *Agathosma*.

With regard to specimen number 270/20 in Herb. LINN, it may be of interest to note that, preserved at the Linnaean Society in London, is a slip of paper upon which Linnaeus wrote a description of *Diosma barbiflora* based upon this specimen of *Macrostylis villosa* which he had received from Thunberg. He had intended that this description should be published together with others written upon similar slips of paper, including that of *D. barbiger*a. However Linnaeus' son, apparently confusing it with *D. barbiger*a, crossed it all out so that it failed to appear in the *Supplementum Plantarum* (1781) and the Linnaean name was unfortunately never validated.

The variation in pubescence, noted by Sonder, is apparently of no taxonomic significance and so Sonder's var. β *glabrata* is therefore placed in synonymy. The above description done from fresh material amplifies those of previous authors.

SPECIMENS EXAMINED

CAPE—3318 (Cape Town): near Melkbosstrand, Malmesbury Division (—CB), 25/11/1951, *Maguire 1726* (NBG); road to Pella near Mamre, Malmesbury Division, 700 ft., 17/1/1973, *Williams 1745* (NBG), 25/1/1977, *Williams 2266* (NBG); Cape Flats near Claremont, Cape Division, (—CD), 7/3/1896, *Wolley Dod 994* (BM, BOL, K), 24/2/1892, *Schlechter 404* (C); Kirstenbosch, slopes north of Window Stream, —/5/1946, *Esterhuysen s.n.* (BOL), 28/9/1947, *Esterhuysen 14057* (BOL), 4/6/1950, *Esterhuysen 17336* (BOL), 500 ft., 4/4/1956, *Esterhuysen 25566* (BOL); Hout Bay valley, slopes below Grootkop, 21/3/1942, *Esterhuysen 7795* (BOL), 21/3/1942, *Compton 13066* (NBG); near Cape Town, —/5/—, *Zeyher 86.5* (C, E, GOET, MEL, S, SAM), —/7/1856, *de Castlemain 450*

(P), 500 (P); Rondebosch flats, -/5/1882, *Tyson* 2744 (E, K, PRE, SAM), 15/5/1898, *Froembling* 786 (BOL-FOURC); Kenilworth Race Course, 1/7/1941, *Walgate* 261 (NBG); Kenilworth, 300 ft., -/3/1895, *Flanagan* 2457 (PRE); on the road between Storms grave and Luyaardsfontein, in the Cape Downs, Stellenbosch Division, (-DC), 12/4/1815, *Burchell* 8359 (K); flats between Duikervallei and Blaauwberg under 200 ft., Cape Division, (111, E, b, 6), 25/7/1826, *Drège* 139 (P, G, PRE, S, W); between Bottelary Road and Main line, Stellenbosch Division, -/2/1932, *Acock* 104 (S); between Brackenfell and Kraaifontein, Stellenbosch Division, 12/4/1977, *Burgers* 419 (Nat. Cons. Herb.); near Lyndoch Station, Stellenbosch Division (-DD), 24/2/1917, *Garside* 667 (K); Geometric Tortoise Reserve, Eensaanheid, Achter Paarl, Paarl Division, 12/4/1977, *Burgers* 425 (Nat. Cons. Herb.).

—3418 (Simonstown): in clivis montis Muizenberg pone Kalk Bay, Cape Division (-AB), 1 000 ft., -/-/1880, *H. Bolus* 4525 (BM, BOL, K, SAM); hills, Muizenberg, 22/12/1922, *Moss* 11242 (BM); in arenosis Muizenberg, 300 m, -/3/1885, *Marloth* 566 (PRE), *Zeyher s.n.* (SAM), -/8/1951, *Stokoe s.n.* (SAM 67237); sandy soil at foot of Muizenberg, -/3/1838, *Bunbury s.n.* (BM); Simons-town, 14/4/1853, *Andersson s.n.* (S); above Noahs Ark Battery, Simonstown, 27/2/1896, *Wolley Dod* 918 (BM, BOL, K); Red Hill, Simonstown, 4/5/1927, *Salter* 245/25 (BM), -/8/1938, *Esterhuysen s.n.* (BOL); mountains over Simons Bay, -/3/1838, *Elliot* 9 (G); Simons Bay, 11/1/1846, *Prior s.n.* (K), 500-1 000 ft., -/4/1887, *Thode* 8514 (STE); Wynberg, 80 ft., 29/2/1896, *Schlechter* 7535 (BM, G, GRA, K), -/2/-, *Roxburgh s.n.* (BM, G), 10/5/1847, *Alexander Prior s.n.* (K); on the flats by Wynberg under 200 ft., (111, E, b, 2), 3/8/1826, *Drège* 365 (P); in arenosis planitiei Capensis prope Wynberg, under 100 ft., -/5/1886, *MacOwan* 2744 (E, K, PRE, SAM); north slopes of Vlakkenberg, 300 m, 23/5/1926, *Andreae* 1117 (PRE, STE); sandy lower slopes at Tierbos, Hout Bay, 20/2/1935, *Acock* 4140 (S); flats, Plumstead and slopes, Claassenbosch, Table Mountain, 1 000 ft., -/3/-, *Lamb* 2646 (SAM); Glencairn, -/4/1950, *Stokoe s.n.* (SAM 64154), 15/4/1930, *Arbuthnot s.n.* (BOL), -/8/1935, *Walgate s.n.* (BOL); Kalk Bay mountains, 24/6/1930, *Hutchinson & Levyns s.n.* (K); Clovelly, 25/2/1940, *Penfold* 236 (NBG); Trappies Kop, 2/3/1941, *Walgate* 213 (NBG); Slangkop, 9/5/1942, *Bond* 1496 (NBG); in arenosis planitiei Capensis prope Princess Vley, -/3/1896, *MacOwan* 1711 (G, GRA, K, P, SAM, W); in the vicinity of Witteboom & Constantia, 25/7/1815, *Burchell* 8590 (K); Smitswinkel, -/4/1929, *Salter* 245/25A (BM), 23/1/1934, *Galpin* 12728 (K, PRE), 16/3/1936, *Cullett* 1495 (K), 26/4/1940, *Compton* 8716 (NBG), 16/3/1941, *Compton* 10637 (NBG); Olifantsbosch, 200 ft., 23/1/1934, *Compton* 4702 (BOL, NBG), 10/5/1946, *Barker* 4008 (NBG); Cape Point, 3/4/1922, *Wilson* SA90 & SA111 (PRE); on the road from Hottentots Holland station to Jonkers Valley (-BB), 30/3/1815, *Burchell* 8303 (K).

Without precise locality: *Harvey* 1096 (BM, BOL, MEL); *Bowie s.n.* (BM);

–/–/1771, *Banks s.n.* (BM, C, W); *Meuron* (B–W 4767/2); *Meuron* (B–W 4783), –/10/1898, *Guthrie s.n.* (BOL), *Hesse s.n.* (G), *Masson s.n.* (G), *Verreaux s.n.* (G), *Ecklon 35* (GOET), –/–/1885, *Forster s.n.* (K), *Grey s.n.* (K), *Harvey 182* (K), *Harvey 495* (K); *Thunberg 493* (LINN 270/20, UPS–THUNB 5724 & 5725, S); –/–/1838, *Lehmann s.n.* (P); *Niven s.n.* (S); *Sieber s.n.* (W); *Guinzis s.n.* (W); *Scholl s.n.* (W); in sabulosis fruticum planitiei Capensis prope Doornhoogde, Wynberg et Muysenberg (Cap), Apr. Maio., *Ecklon & Zeyher 817* (C, G, GOET, K, LD, MEL, P, PRE, S, SAM, W).

DISTRIBUTION AND VARIATION

Macrostylis villosa is found growing in sandy soil at altitudes of from 30 to 300 m above sea level on the Cape Peninsula and on the Cape Flats as far north as Mamre. Many of the areas where it once flourished are now covered by urbanisation or by alien vegetation. Variation appears to be confined to the degree of pubescence on the twigs and leaves. A rare plant, only once collected by Acocks on the gravelly and clayey soil on the lower north slopes of the Bottellary hills, matches *M. villosa* in all respects except that all parts are very much smaller in size. As no intermediates or hybrids have been found it has been given the rank of subspecies.

Macrostylis villosa is recognised as distinct being one of only two *Macrostylis* species that coppice after fires, having the stigma capitellate and having leaves lanceolate acute 4–13 mm long with the apex truncate.

2a. *Macrostylis villosa* (Thunb.) Sond. subsp. **minor** Williams, subsp. nov.

Type: gravelly and clayey soil on lower north slopes of Bottellary hills, –/5/1934, *Acock(s) 2654* (S).

Foliis ad 8 mm longis, planta in omnes partes parviores distinguitur.

Shrubs 100–150 mm tall with many slender stems arising from a persistent rootstock. *Branchlets* short, rough, glabrous, spreading. *Leaves* 8 mm long, 0.8 mm broad, narrowly lanceolate, acute, glabrous, glaucous, short-petiolate, alternate, spreading; apex truncate; margins rounded; abaxial surface gland-dotted along the margins and along the prominent midrib. *Inflorescence* terminal, umbellate-capitate, about 12 flowered. *Bract* outermost somewhat leaf-like, 4.5 mm long, 0.7 mm broad, innermost very much reduced. *Bracteoles* two at the base of the pedicel, 0.5 mm long, 0.3 mm broad, pale, somewhat ovate, glabrous, ciliolate. *Pedicel* 1.5 mm long, glabrous. *Calyx lobes* five, 1.3 mm long, 0.6 mm broad, lanceolate, acute, glabrous, minutely ciliolate. *Petals* 1.7 mm long overall; *limb* 0.7 mm broad, ovate; *claw* crisped bearded in the middle and down the midrib, strongly crisped ciliate. *Staminodes* five, 0.05 mm long at the base of the disc. *Filaments* five, becoming about 2 mm long, glabrous. *Disc* purplish,

envelops the ovary. *Stigma* capitellate. *Style* becoming 2.5 mm long, glabrous. *Ovary* tricarpellate, glabrous. The rest not seen.

SPECIMEN EXAMINED

As above.

DISTRIBUTION

So far this plant has only been collected once by J. P. H. Acock(s) on the north slopes of Bottellary Hills. This area is now under fairly intensive cultivation and, in spite of searches having been made, it has not been rediscovered. Its small size may be an adaptation by *M. villosa* subsp. *villosa* to a different habitat, i.e. from the normal deep sandy soil to a hard gravelly-clayey and perhaps much drier soil.

M. villosa subsp. *minor* is easily distinguished from *M. villosa* subsp. *villosa* in having leaves not longer than 8 mm and in being a plant much smaller in all respects.

3. *Macrostylis ramulosa* Williams in Jl S. Afr. Bot. **44**(4): 356 (1978). Type: CAPE—3219 (Clanwilliam): north facing gravelly slopes, Middelberg Pass near Kleinplaas, Citrusdal (—CA), 777 m (2 550 ft.), 12/7/1975, *Williams 2017* (NBG, holotype; BOL, K, M, MO, PRE, S, STE, isotypes).

Macrostylis ramulosa is distinct on account of being a semi-decumbent shrub with many branchlets sprouting towards the base, with linear-lanceolate or subulate, acute, pubescent leaves, hairy at the tips, without any prominent midrib, with pubescent bracts 2, 4–4, 5 mm long, with bracteoles and calyx pubescent at their tips, with the style simple and with the fruits pubescent. It differs from *M. villosa* (Thunb.) Sond. which has leaves rather flat and prominently keeled, not round backed, and from *M. decipiens* E. Mey. ex Sond. which is a much more glabrous plant with smaller leaves, with the apex often bi-glandular trunculate not blunt and hairy.

4. *Macrostylis decipiens* E. Mey. ex Sonder in Flor. Cap. **1**: 439 (1860). Type: Rocky places at Piquetberg, 1 500–2 000 ft., (111, A, d, 23), 13/11/1828 *Drège s.n.* (S, lectotype; MEL, isotype).

Macrostylis decipiens E. Mey. in Drège, Zwei Pflanz. Doc.: 76.; 200 (1844) nom. nud. Type: as above.

Shrubs 200–300 mm tall, many-stemmed with a persistent root, coppicing after fires. *Branches* short, erect, slender, sparsely puberulous becoming glabrous, pale becoming reddish-brown, well-clothed with leaves. *Leaves* 4–6 mm long, 1, 4–1, 8 mm broad, lanceolate, acute, sessile, alternate, erect, imbricate; apex often trunculate; margins ciliolate, gland-dotted; adaxial surface glabrous,

flat; abaxial surface sparsely puberulous or glabrescent, gland-dotted along the midrib. *Inflorescence* terminal, sessile, up to 8-aggregate. *Bract* one to each flower, outermost leaf-like, inner 1,2 mm long, 0,7 mm broad, lanceolate, puberulous, ciliolate. *Bracteoles* two, 0,8 mm long, 0,6 mm broad, ovate-lanceolate, puberulous, ciliolate. *Calyx lobes* five, 2 mm long, 1 mm broad, lanceolate, obtuse or trunculate, ciliolate; midrib sparsely pubescent above. *Petals* five, 5 mm long; *limb* 1,8 mm diam., approximately orbicular, white; *claw* 3,2 mm long, 1,1 mm broad, strongly bearded above with erect hairs, shorter crisped pubescent below, eciliate, narrowing and glabrous towards the base. *Staminodes* five, 0,05 mm long, vestigial, situated in a depression on the disc at the base of the petal. *Filaments* five, becoming 6 mm long, glabrous, protruding. *Anthers* five, before anthesis 1,3 mm long, 0,7 mm broad, reddened, apical gland minute. *Pollen* 51–55 μ long, 21–23 μ diam., oblong. *Disc* green, closes over the ovary, exudes nectar. *Stigma* 0,12 diam., a minute red dot, simple. *Style* becoming 6 mm long, terete, glabrous, scarcely narrowing below. *Ovary* tri-carpellate, 0,6 mm diam., glabrous. *Fruit* 1,2 or 3-carpellate; carpels 12–14 mm long, glabrous, reddened; horns 3–5 mm long, erect or slightly recurved. *Seed* 5 mm long with the white aril protruding another $\frac{1}{2}$ mm at the apex, 2 mm broad, black, matt.

In validating E. Meyer's manuscript name for this plant, *Macrostylis decipiens*, Sonder cites collections by both Drège and Zeyher. That of Drège has been chosen as the lectotype as it was a portion of this collection that was seen by Meyer. Unfortunately the actual specimen seen by Meyer was lost when his herbarium, housed at Berlin, was destroyed by fire during the war. The descrip-

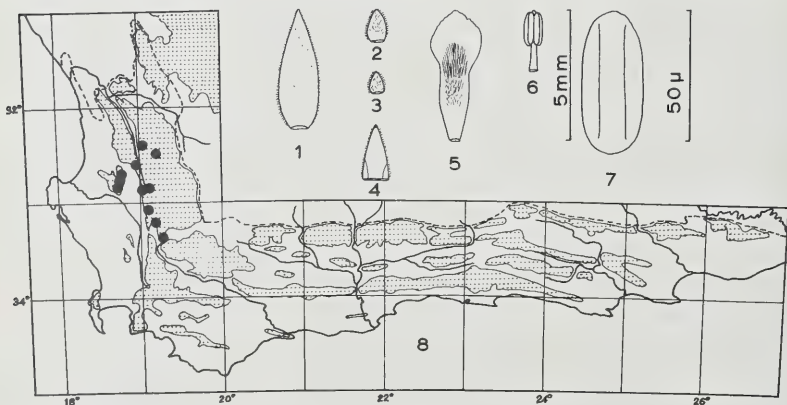


FIG. 4.

Macrostylis decipiens: 1, leaf. 2, bract. 3, bracteole. 4, calyx lobe. 5, petal. 6, anther. 7, pollen. 8, distribution.

tion given above, made from fresh material, amplifies that of Sonder in the *Flora Capensis*.

SPECIMENS EXAMINED

CAPE—3218 (Clanwilliam): In arenosis pr. Piqueniers kloof (—DB), 280 m, 22/8/1894, *Schlechter 4939* (BM, K, P, S, W, BR); W. slopes of Zebra Kop, Piketberg Mt., 3 000–3 500 ft., 23/5/1948, *Esterhuysen 14500* (BOL, K, LD, NBG); near The Rest, Olifants River Mtns., 25/9/1923, *Howes 180* (K, PRE, W); Zebra Kop, 3 500 ft., —/5/1948, *Stokoe s.n.* (SAM 64153), 900–2 900 ft., 14/10/1963, *Taylor 5339* (STE), 2 500–3 000 ft., 13/10/1963, *Esterhuysen 30401* (BOL); Piquetberg (—DC), 1 500–2 000 ft., 13/11/1828, *Drège 111. A. d.* (BM, BOL, E, G, K, LD, MEL, P 1884, PRE, S, SAM, W); plateau above Versveldts Pass, Piketberg Mt., 2 500 ft., 25/4/1948, *Esterhuysen 14474* (BOL, K, NBG); W. slopes of Levant, Piketberg Mt., 3 000 ft., 24/5/1948, *Esterhuysen 14505* (BOL, K, LD, NBG); Piketberg, 10/9/1950, *Maguire 431* (NBG), —/2/1940, *Zinn s.n.* (SAM); Vogelvley (—DD), 2 000 ft., 27/6/1896, *Schlechter 7921* (BM, BOL, E, G, GRA, K, P, PRE, S, W).

—3219 (Wupperthal): Lower N.E. slopes of Suurvleiberg (—AC), —/12/1939, *Esterhuysen 2490* (BOL); valley between Suurvleiberg and Vensterberg, 5 000 ft., —/12/1939, *Esterhuysen 2505* (BOL); S.W. slopes of Middelberg, —/12/1939, *Esterhuysen 2482* (BOL), 22/6/1942, *Esterhuysen 7855* (BOL), 25/9/1937, *Compton 7063* (NBG); Cedarberg, Algeria, N. slopes, 24/6/1942, *Esterhuysen 7844* (BOL), 1 400 ft., 23/1/1963, *Rycroft 2633* (NBG); Krom River Kloof, S. Cedarberg (—CA), 11/12/1950, *Esterhuysen 17970* (BOL); S.W. slopes of the Grootberg, 3 500 ft., 21/12/1940, *Esterhuysen 4151* (BOL, K); Grasruggens Mtns. (—CC), 26/11/1938, *Pillans 8787* (BOL); sandy vlakte, 24 Rivers Mtns., Porterville, 3 000 ft., 23/10/1949, *Esterhuysen 16145* (BOL, K, NBG), 10/10/1953, *Esterhuysen 21891* (BOL), 17/12/1962, *Esterhuysen 29959* (BOL); above Thee River and below Olifants River Dome, 11/5/1963, *Esterhuysen 30176* (BOL); Cardouw Pass, 4/11/1951, *Maguire 1219* (NBG); Berghof near Ratel River, Porterville Mtns., 2 600 ft., 27/9/1972, *Oliver 3923* (STE); Dasklip Pass summit, Cardouw Mtns., 2 400–2 600 ft., 6/10/1971, *Williams 1546* (NBG); Zuurvlaakte, Porterville Mtns., 3 400 ft., 24/1/1973, *Williams 1748* (NBG).

—3319 (Worcester): Inkruip. Witsenberg (—AA), 1/10/1954, *Esterhuysen 23484* (BOL); In montibus ad 24 Riveren, —/12/—, *Zeyher 293* (G, K, MEL, S, SAM); Mt. above Kliphuisvlakte, Porterville, 4 000 ft., 24/1/1973, *Williams 1753* (NBG); Mitchells Pass (—AD), 1 000 ft., 14/1/1897, *Schlechter 9951* (BM, BOL, G, GRA, K, P).

DISTRIBUTION AND VARIATION

Macrostylis decipiens is found growing in rather dry stony sand derived from the Table Mountain Sandstone at altitudes varying from 250 to 1 500 metres

above sea level. Populations extend from the vicinity of Mitchells Pass near Ceres in the south to the Krakadouwsberg near Clanwilliam in the north with outliers on the Piketberg to the west and on the Gifberg near Vanrhynsdorp in the north.

There appears to be considerable variation in the pubescence of this plant. A collection from near Algeria (Rycroft 2633) has branchlets and leaves completely glabrous and even glaucous with the leaves eciliate thus varying from the more normal condition where the branchlets and leaves may be sparsely puberulous and ciliate or serrulate. A collection from Apollo Peak in the Southern Cedarberg (Esterhuysen 25515) shows leaves that are puberulous and considerably broader than usual.

Macrostylis decipiens from mountainous areas, appears to be most closely related to *M. villosa* which is found in the sandy plains. Both species frequently produce leaves in which the midrib and margins terminate at the apex in two separate points, giving a truncated appearance to the leaf. This is a valuable diagnostic character. The leaves of *Macrostylis decipiens* are however very much smaller. Another character which these two plants share is an ability to coppice from the rootstock after fires.

Furthermore, *M. decipiens* is distinct in having the stigma simple, and leaves lanceolate-acute with a distinct midrib usually 4 to 6 mm long. It differs from *M. villosa* which has leaves 4–13 mm long and from *M. ramulosa* which has leaves subulate, without a distinct midrib. *M. decipiens* can be distinguished from *M. tenuis* in that it is a plant with many erect stems that may coppice from the root after fires whereas *M. tenuis* is single-stemmed at base. The branchlets of *M. decipiens* tend to be erect, the leaves lanceolate and the fruit always 3-carpellate whereas in *M. tenuis* the branchlets may be spreading-erect, the leaves elliptic and the fruit two or three-carpellate.

5. *Macrostylis tenuis* E. Mey. ex Sonder in Flor. Cap. 1:440 (1860). Type: Rocky places on the Cedarberg, 3 000-4 000 ft., 13/12/1830 Drège *s.n.* (S, lectotype).

Macrostylis tenuis E. Mey in Drège Zwei Pflanz. Doc.:73,200 (1844) nom. nud. Type: as above.

Macrostylis ovata Sonder in Flor. Cap. 1:441 (1860). Type: In interioribus Prom. Bonae Spei, Niven *s.n.* (BR-MART 1150, S).

Shrubs 0,15 to 0,9 m tall, spreading up to 2 m, dense or diffuse, branching from ground level. *Branches* numerous, spreading-erect, glabrous; *bark* ashy-brown, fairly smooth. *Branchlets* numerous, spreading-erect, often dichotomous, fairly short, rigid, minutely puberulous. *Leaves* up to 3 mm long, 0,8–1,6 mm broad, ovate or elliptic, obtuse, rather thick or sometimes flat, sessile, spreading-erect, usually alternate, glabrous or puberulous on both sides, gland dots scattered; margins scabrid-denticulate, gland-dotted. *Inflorescence* terminal,

up to 6-aggregate; flowers 2.5 mm diam., crowded, sessile, white-cream coloured. *Bract* varies, 1.2–1.7 mm long, 0.6–1.2 mm broad, ovate, obtuse, puberulous, gland-dotted; margins scabrid-puberulous. *Bracteoles* two, 1 mm long, 0.4–0.6 mm broad, elliptic, obtuse, puberulous, ciliolate. *Calyx lobes* five, 1.3–1.5 mm long, 0.4–0.7 mm broad, oblong, obtuse, adaxially puberulous, gland-dotted, ciliolate. *Petals* five, 2.6 mm long overall; *limb* 0.9–1.1 mm broad, orbicular, gland-dotted; *claw* 1.5 mm long, narrowing to the base, densely crisped bearded above mostly towards the midrib. *Staminodes* five, 0.1 mm diam. or less, vestigial, at the base of the disc. *Filaments* five, becoming 3–4 mm long, filiform, glabrous. *Anthers* five, 0.7 mm long, 0.5 mm broad, reddened; apical gland globose, sessile. *Pollen* 45–51 μ long, 18–21 μ broad, oblong. *Disc* fleshy, green, closes over the ovary. *Stigma* 0.1 mm diam., red, simple. *Style* becoming 4–5 mm long, glabrous. *Ovary* 2 or 3-carpellate, 0.5 mm long, 0.3–0.5 mm broad, glabrous; apices setulose. *Fruit* 2 or 3-carpellate, 12 mm long including the horn about 4 mm long, carpels smooth or puberulous, gland-dotted, reddened, only one or two may develop. *Seed* 5.2 mm long, with the white aril projecting a further 1–2 mm, 2.2 mm broad, black, mottled, matt.

Specimens distributed by Drège labeled "*Macrostylis tenuis* E.M." appear to have been part of a mixed collection. The name *Macrostylis tenuis* validated by Sonder applies to one of the elements in this collection. The other element, which Sonder probably never saw is a plant belonging to the species *Macrostylis*

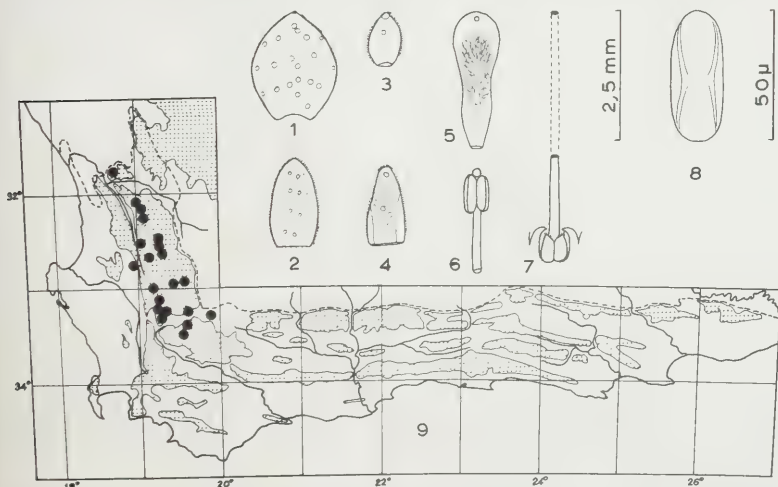


FIG. 5.

Macrostylis tenuis: (from Williams 2080) 1. leaf. 2. bract. 3. bracteole. 4. calyx lobe. 5. petal. 6. anther. 7. gynoecium and disc. 8. pollen. 9. distribution.

squarrosa Bartl. & Wendl. *M. tenuis* has been collected many times and over a large geographical range by Miss E. Esterhuysen of the Bolus Herbarium. The above description made mainly from fresh material (Williams 2000, Williams 2080) amplifies that given by Sonder and describes the variation encountered in this species.

SPECIMENS EXAMINED

CAPE—3118 (Vanhynsdorp): Giftberg, Vanhynsdorp Division (–DC), 2 000 ft., 15/10/1953, *Esterhuysen* 22126 (BOL).

—3219 (Wupperthal): Pakhuis, Clanwilliam Division (–AA), 29/9/1940, *Esterhuysen* 3150 (BOL), 29/9/1940, *Esterhuysen* 3151 (BOL), above 3 500 ft., –/12/1940, *Leipoldt* 3348 (BOL, NBG), 28/12/1941, *Esterhuysen* 7389 (BOL), 20/9/1942, *Esterhuysen* 8011 (BOL), 17/1/1953, *Esterhuysen* 21156 (BOL); between Pakhuis and Heuningvlei, Cedarberg Mountains, Clanwilliam Division, 28/12/1941, *Esterhuysen* 7431 (BOL), 28/12/1941, *Esterhuysen* 7454 (BOL); Cedarberg, –/3/1932, *Stokoe* 2604 (BOL, SAM); Heuningvlei and on the Koudeberg, Cedarberg, 3 000–4 000 ft., 111.A.D.10, 13/12/1830, *Drège* s.n. (BM, MEL, S); Heuningvlei, 23/9/1942, *Esterhuysen* 8063 (BOL); between Heuningvlei and Haasvlei, 15/1/1953, *Esterhuysen* 21134 (BOL); between Heuningvlei and Koupoort (–AC), 2 000–3 000 ft., 21/10/1945, *Esterhuysen* 12114 (BOL); between Heuningvlei and Boontjieskloof, 31/12/1941, *Esterhuysen* 7522 (BOL); Krakadouw Peak, Cedarberg, –/12/1941, *Stokoe* s.n. (SAM 58849); between Crystal Pool and Scorpions Poort, 26/6/1942, *Esterhuysen* 7903 (BOL); shale band below Cedarberg Tafelberg, Clanwilliam Division, 5 000 ft., 16/12/1950, *Esterhuysen* 18161 (BOL); Welbedagt Kloof below Cedarberg Tafelberg, 26/9/1942, *Esterhuysen* 8106 (BOL); Dwarsrivier, sandy flats amongst rocks (–AD), –/3/1940, *Esterhuysen* 2511 (BOL); at foot of Wolfberg, Cedarberg, 26/12/1953, *Esterhuysen* 22471 (BOL); Krom River Kloof, S. Cedarberg, Clanwilliam Division (–CA), 3 000–4 000 ft., 11/12/1950, *Esterhuysen* 17991 (BOL); Apollo Peak, 3 000–4 000 ft., 31/3/1956, *Esterhuysen* 25515 (BOL); east spur of Hondverbrand Ridge, S. Cedarberg, Ceres Division, 21/4/1946, *Esterhuysen* 12737 (BOL); Duiwelskop, near Citrusdal, Clanwilliam Division, 3 500 ft., –/1/1945, *Stokoe* 9144 (BOL, SAM); Donkerkloof Kop, –/1/1945, *Stokoe* s.n. (SAM 58846); Cold Bokkeveld Mtns. at Elands-kloof, Clanwilliam Division, 25/3/1951, *Esterhuysen* 18453 (BOL); Gideonskop, S. Cedarberg, Ceres Division, 4 000 ft., 6/4/1947, *Esterhuysen* 13887 (BOL); Dwarsriviersberg, South Cedarberg, Clanwilliam Division (–CB), 3 500–4 000 ft., 1/4/1956, *Esterhuysen* 25554 (BOL); Krom River, S. Cedarberg, 3 000–4 000 ft., 4/10/1952, *Esterhuysen* 20492 (BOL); ridge S. of Krom River, S. Cedarberg, 3 500 ft., 18/9/1975, *Williams* 2085 (NBG); Onderboskloof, Ceres Division (–CC), 26/10/1966, *Esterhuysen* 31630 (BOL); sandy flats between 24 Rivers and Pikeniers Kloof, 400–800 ft., 111. D.a. 16/1/1831, *Drège* 7149 (G, P); Keerom, 3/12/1950,

Esterhuysen 17870 (BOL); Schurweberg Peak, N.E. of Bokkeveld Tafelberg, Ceres Division (-CD), 31/12/1961, *Esterhuysen 29430* (BOL), 1/12/1962, *Esterhuysen 29449* (BOL); Stompiesfontein, Swartuggens, Ceres Division (-DC), 3 500 ft., 18/11/1961, *Esterhuysen 29333* (BOL); Groenfontein, Swartuggens, 4 000 ft., 20/11/1974, *Williams 1930* (NBG), 3 900 ft., 18/9/1975, *Williams 2080* (NBG).

—3319 (Worcester): Boboskloof, ridge S. of ruin (-AA), 720–1060 m, 22/11/1975, *Williams 2151* (NBG); Visgat, upper Olifants River Valley, Ceres Division, 26/12/1946, *Esterhuysen 13405* (BOL, K, NBG, P); Visgat, 15 miles N. of Die Vlake, 2 000 ft., 30/12/1962, *Taylor 4545* (PRE, STE); Visgat, Ceres Division, 820 m, 15/5/1975, *Williams 2000* (NBG), 620 m, 2/12/1975, *Williams 2155* (NBG); Witsenberg Vlake a few miles before Visgat, 2 000–3 000 ft., 11/1/1960, *Esterhuysen 28401* (BOL); Rocklands Peak, Cold Bokkeveld, Ceres Division, 4 500–5 000 ft., 5/6/1955, *Esterhuysen 24326* (BOL); Koude Bokkeveld, Skurfdebergen pone Elandsfontein, Ceres Division, 5 500 ft., 18/1/1897, *Schlechter 10040* (BOL, BR, E, G, GRA, K, P, W); Hansiesberg, W. slopes, Ceres Division, 4 000–5 000 ft., 18/4/1956, *Esterhuysen 25706* (BOL); Gydoberg, N. Slope, 10/11/1946, *Walgate 1117* (BOL); Baviaansberg, Ceres Division (-BA), 5 500 ft., 4/11/1962, *Esterhuysen 29803* (BOL), -1/1937, *Stokoe 4549* (BOL); Baviaansberg slopes above Karroo Poort, 30/6/1940, *Esterhuysen 2578* (BOL); Koedoedouw Kloof, Ceres Division (-AD), 31/1/1954, *Esterhuysen 22550* (BOL, K); Valschgat Kloof, Roodeberg, Ceres Division (-BC), 4 000 ft., -1/1940, *Esterhuysen 1543* (BOL); Roodeberg, 6 000 ft., -12/1940, *Stokoe 7667* (BOL), 5 000 ft., 19/1/1940, *Compton 8407* (NBG), 27/12/1952, *Esterhuysen 20910* (BOL); Matroosberg, shale band on plateau near Peak "C", 5 000 ft., -1/1941, *Stokoe s.n.* (BOL, SAM 58813); sandy flats at N.E. foot of Matroosberg, 6/8/1951, *Esterhuysen 18741* (BOL); Matroosberg near Laakenvlei Kloof, 3 500 ft., 20/1/1917, *Phillips 1960* (SAM); In convalle Hex River prope De Doorns, Worcester Division, -1/1908, *H. Bolus 13080* (BOL, BM, K, GRA, STE); foot of Kvados Mtns. near Orchard, 24/11/1944, *Esterhuysen 10932* (BOL); Bokkerivier Farms, 19/3/1974, *Thompson 4* (NBG); Bonteberg, Eikenboschhoek, 3 500–4 000 ft., 3/11/1940, *Esterhuysen 3652* (BOL); 2,7 km beyond Sandhills turnoff, Worcester Division (-DA), 1 550 ft., 4/12/1971, *Williams 1606* (NBG); Buffelshoekkloof, 28/4/1942, *Esterhuysen 7811* (BOL); Blaaskloof, at W. base of Keeromsberg, 23/2/1958, *Esterhuysen 27585* (BOL); sandy rocky slopes above Sandhills, Hex River Valley, Worcester Division, 28/9/1978, *Esterhuysen 35048a* (BOL).

DISTRIBUTION AND VARIATION

Macrostylis tenuis is found growing in stony or hard sandy ground associated with the Table Mountain Sandstone at altitudes varying from about 200 to 1 800 metres above sea level. The geographical distribution extends in a more or less

north-south direction from the Giftberg near Vanrhynsdorp to near Sandhills in the Hex River Valley, a distance of approximately 210 km. Over this range of distance and altitude there is some variation in the species. In only one case (*Esterhuysen 21156*) has it been noted that leaves which are normally alternate, may be found to be opposite. Without apparent reason leaves may be glabrous, scabrid, clothed with a short spiky pubescence or quite hairy. Although in most cases the leaves are spreading-erect, they may also be found to be adpressed (*Esterhuysen 17991*) or spreading (*Esterhuysen 22550*). Fruits usually have very long horns. The longest are on specimens from the Giftberg (7 mm, *Esterhuysen 22126*) at the northern limit of distribution and the shortest on specimens from the Hex River Valley (1.5 mm, *Bolus 13080*) at the southern limit of distribution.

Macrostylis tenuis is recognised as distinct being a shrub arising from a single stem at ground level, not coppicing after fires, having branchlets spreading-erect, leaves elliptic or ovate, obtuse with gland dots scattered and on margins, with the apex thickened, the style simple and fruits 2 or 3-carpellate. It differs from *M. decipiens* which coppices after fires, has erect branchlets, lanceolate leaves and fruits always 3-carpellate. It differs from *M. cauliflora* which has a capitellate style.

6. *Macrostylis cauliflora* Williams in Jl S. Afr. Bot. **41**(3): 183(1975). Type: CAPE—3419 (Caledon): near the Kouderivier between Gansbaai and Napier, Bredasdorp Division (—DA), 76 m alt., 27/2/1974, *Williams 1876* (NBG, holotype; BOL, K, MO, M, PRE, STE, isotypes).

ADDITIONAL SPECIMEN EXAMINED

CAPE—3419 (Caledon): Kleinberg, Napier commonage, Bredasdorp Division (—BD), 240 m alt., 9/5/1978, *Williams 2492* (NBG).

Macrostylis cauliflora is recognised as distinct being a small shrub with leaves gland-dotted only on the midrib and margins, and with the stigma capitellate, rather larger than usual. It is in appearance most like *Macrostylis crassifolia* Sond. but differs in that the leaves of *M. crassifolia* are gland-dotted all over, not only on the midrib and margins.

7. *Macrostylis squarrosa* Bartl. & Wendl., Diosmeae in Beitr. Bot. **1**: 198 (1824). Type: Cap. b. Spei, in regione Olofrivier, *Hesse s.n.* (GOET—WENDL, lectotype; GOET, S, isotypes).

Macrostylis obtusa Bartl. & Wendl., Diosmeae in Beitr. Bot. **1**: 197 (1824). Type: Cap. b. Spei, pr. Olofrivier, *Hesse s.n.* (GOET, MEL, S).

Diosma squarrosa Wendl. nom. nud.

Diosma obtusa G. F. W. Meyer nom. nud.

Shrubs about 0.3 m tall, densely bushy, single-stemmed at base. *Branchlets* very short, erect or sub-erect, numerous, interlocking, somewhat reddish, puberulous at first, not hidden by the leaves. *Leaves* 3.3 mm long, 1.7 mm broad, smaller on branchlets, ovate or ovate-oblong, obtuse, sessile, alternate, spreading and strongly recurved; adaxial surface hollowed along the middle, glabrous except just at the base; abaxial surface with the prominent midrib gland-dotted and bristly with very short hairs; margins gland-dotted, thick, and bristly with scattered hairs. *Inflorescence* terminal; flowers 5 to 7-aggregate, sessile; petals white. *Bract* 2 mm long, 1 mm broad, leaf-like, the inner becoming much reduced. *Bracteoles* two, 0.9–1.1 mm long, 0.6–0.8 mm broad, ovate, translucent, pubescent, minutely ciliate. *Calyx lobes* five, 1.2 mm long, 0.4 mm broad, oblong, virtually glabrous; apex thick, obtuse; midrib prominent, gland-dotted, margins ciliate, translucent below. *Petals* five, 2.8 mm long overall; *limb* 1 mm broad, orbicular; *claw* 0.7 mm broad narrowing below, bearded and ciliate above. *Staminodes* 0.2 mm long, clavate, between petal and disc. *Filaments* five, becoming 5 mm long, acicular, glabrous. *Anthers* five, 0.8 mm long, 0.6 mm broad, yellowish; apical gland minute. *Pollen* 44 μ long, 21 μ diam., oblong. *Disc* closes over the ovary, smooth, dark green, exudes nectar. *Stigma* simple. *Style* becoming 5 mm long, filiform, glabrous. *Ovary* 3-carpellate, 0.5 mm diam., glabrous. *Fruit* 3-carpellate of which often only one matures, 9.5 mm long overall including the horn 3–4 mm long, 2.5 mm diam., glabrous except for a very few short bristles on the horn, conspicuously gland-dotted. *Seed* 4.8 mm long, 1.6–1.8 mm diam., black, mottled, matt; endosperm white on a truncated surface.

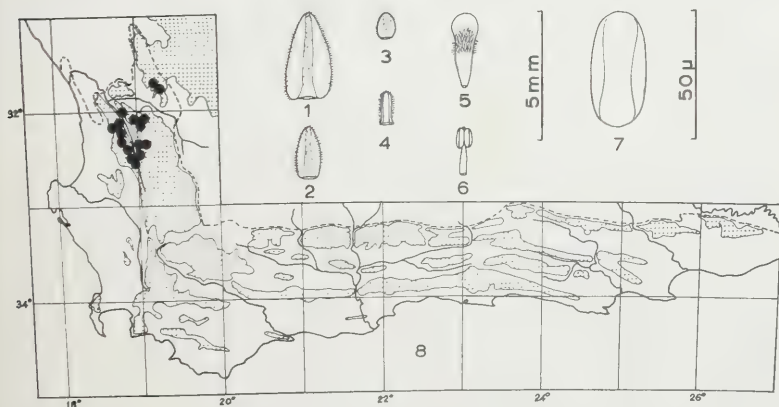


FIG. 6.

Macrostylis squarrosa: 1. leaf. 2. bract. 3. bracteole. 4. calyx lobe. 5. petal. 6. anther. 7. pollen. 8. distribution.

Macrostylis squarrosa appears to have been first collected by Hesse in the vicinity of the Olifants river (of which the name Olofrivier appears to be a corruption). Fragments of what were probably portions of the same collection were given the manuscript names of *Diosma squarrosa* by Wendland and *Diosma obtusa* B. & W. to synonymy. The above description based upon fresh material maintained the name *obtusa* as their *Macrostylis obtusa* but later Sonder, realising these taxa to be conspecific, upheld *M. squarrosa* B. & W. and reduced *M. obtusa* B. & W. to synonymy. The above description based upon fresh material (Williams 1759) supplements that previously given by Bartling & Wendland.

SPECIMENS EXAMINED

CAPE—3119 (Calvinia): Lokenberg, 21 miles S. of Nieuwoudtville, Calvinia Division (—CA), 13/10/1953, *Story* 4347 (GRA, K, PRE), 2 300 ft., 29/8/1953, *Acocks* 17041 (K, PRE); top of Botterkloof Pass, Calvinia Division (—CD), 24/8/1950, *Barker* 6514 (BOL, NBG).

—3218 (Wupperthal): $\pm$ 1 mile N. of Seekoevlei (—BA), 1 250 ft., 22/8/1976, *Williams* 2192 (NBG); $\frac{3}{2}$ miles E. by N. of Graafwater, 1 100 ft., 22/8/1958, *Acocks* 19652 (PRE); Pakhuis Pass, Clanwilliam Division (—BB), —/8/1934, *Pillans* 7078 (BOL, PRE), 29/9/1940, *Esterhuysen* 3152 (BOL, SAM), 2 800 ft., 4/10/1897, *H. Bolus s.n.* (BOL), —/2/1941, *Leipoldt* 3662 (GRA, K, NBG), 7/12/1934, *Salter* 5035 (K), 2 500 ft., 2/10/1948, *Acocks* 15030 (K, PRE), 1/12/1934, *Compton* 4768 (NBG), 17/8/1939, *Compton* 7742 (NBG), 30/9/1940, *Compton* 9599 (NBG), 5/9/1948, *Compton* 20940 (NBG), 7/9/1949, *Barker* 5621 (NBG), 6/9/1951, *Johnson* 253 (NBG), 19/10/1965, *Barker* 10317 (NBG), 1 000–2 500 ft., 3/9/1947, *Story* 2972 (PRE), 9/9/1938, *Gillett* 4065 (BOL, PRE), 27/8/1937, *Compton* 6851 (NBG); Kransvlei, 14/9/1947, *Compton* 20030 (NBG); Nardouw kloof, —/9/1947, *Stokoe s.n.* (SAM 64156); 5 miles W. of Clanwilliam, —/7/1948, *Lewis s.n.* (SAM 64155); N. slope of the Schimmelberg, Clanwilliam Division (—BD), 12/10/1939, *Pillans* 9117 (BOL, GRA, K, NBG); Kransvallei/Elandsfontein, top of rise, —/9/1947, *L. Bolus s.n.* (BOL 23756); Lambertshoekberg, 10/9/1950, *Barker* 6706 (BOL, NBG), 31/8/1935, *Compton* 5559 (NBG); Haarwegskloof near Marcuskraal, 1050 ft., 1/12/1976, *Williams* 2251 (NBG); Blauwberg (N.E. of Citrusdal) Clanwilliam Division (—DB), 1 500 ft., 10/8/1896, *Schlechter* 8469 (BM, BOL, G, GRA, K, P, PRE, S, W); in arenosis pr. Piqueniers Kloof, 850 ft., 22/8/1894, *Schlechter* 4939 (BOL ex parte, GRA, MEL, PRE, STE).

—3219 (Clanwilliam): in fruticetis inter Pakhuis et Biedouw (—AA), 4/10/1897, *H. Bolus* 8956 (BOL); between Pakhuis and Heuningvlei, 28/12/1941, *Esterhuysen s.n.* (BOL); rocky places between Heuningvlei and Biedouw 2 500–3 000 ft., 13/12/1830, *Drège s.n.* (E, G, MEL, P 7156, S, W) part of a mixed collection; Pakhuis near village, 13/9/1947, *Barker* 4688 (NBG); Nieuwoudt Pass, Clanwilliam Division (—AC), 2 000 ft., 26/9/1934, *Leighton s.n.* (BOL

21582, P), 13/12/1941, *Compton* 12680 (NBG), 1 900 ft., 8/10/1975, *Williams* 2102 (NBG), 4/9/1938, *Halfstrom & Acocks* 790 (PRE, S); Cedarberg, Middleberg, S. slopes, 15/12/1941, *Esterhuysen* 7286 (BOL, NBG); Cedarberg, Middleberg, plateau, 14/12/1941, *Esterhuysen* 7209 (BOL), 11/2/1936, *Compton* 6250 (NBG); Algeria, Cedarberg, 16/12/1942, *Compton* 12768 (NBG); Algeria, bottom of Cedarberg Pass, 2 000 ft., 13/2/1973, *Williams* 1759 (NBG); between Alpha and Uitkyk Pass, Cedarberg, 26/9/1934, *Acocks* 3034 (S); Brakfontein, -/8/-, *Zeyher* 50 (S); in solo ericeto-arenosa (altit. 11,111) laterum montium prope Brakfontein, Clanwilliam Division, -/8/-, *Ecklon & Zeyher* (G, GOET, K, MEL, P, SAM, W).

DISTRIBUTION AND VARIATION

Macrostylis squarrosa is found growing in sandy ground derived from the surrounding Table Mountain Sandstone at heights varying from 260 to 850 m above sea level on the mountains flanking the Olifants River in the Clanwilliam Division. The distribution extends from near Citrusdal in the south to Nardouwsklouf in the north, a distance of about 70 kilometres, with disjunct populations a further 45 kilometres away on the Bokkeveld mountains in the Calvinia Division.

There appears to be a certain amount of variation in the degree of pubescence on the leaves and fruits and also in the amount by which the leaves are recurved. The variation in these characters is however of no taxonomic significance.

Macrostylis squarrosa is distinct in having a densely bushy squarrose habit with the leaves ovate or oblongovate, obtuse, spreading and strongly recurved and in having the stigma simple.

8. *Macrostylis crassifolia* Sonder in Flor. Cap. 1: 440 (1860). Type: Bergvallei, Clanwilliam Division, -/1/- *Zeyher* 294 (S, lectotype; BM, BOL, G, GOET-WENDL, K, LD, MEL, P, PRE, SAM, W, isotypes).

Macrostylis crassifolia Sond. var *affinis* Sond. in Flor. Cap. 1: 440 (1860). Type: *Drège* 7157 (S, lectotype; K, P, W, isotypes).

Shrubs 1 m tall, round, dense with many stems arising from ground level. *Branches* numerous, fairly erect, glabrous; bark rough, dusky-brown. *Branchlets* numerous, slender, erect, very sparsely puberulous, not hidden by the leaves. *Leaves* 2–3.6 mm long, 1.5–2.0 mm broad, elliptic, obtuse, sessile, glabrous, subglaucous, spreading-erect, alternate; abaxial surface gland-dotted all over, midrib prominent; margins thick, gland-dotted. *Inflorescence* terminal with flowers creamy-white, sessile, up to 8-aggregate. *Bract* one to each flower, 0.8–1.4 mm diam., the outermost larger, orbicular, obtuse, glabrous, gland-dotted. *Bracteoles* two, 1 mm long, 0.6 mm broad, asymmetrically orbicular, ciliolate, glabrous, gland-dotted. *Calyx lobes* five, 1.5 mm long, 0.8 mm broad, oblong,

very obtuse, apex thickened, glabrous, gland-dotted; margins below translucent and ciliolate. *Petals* five, 3 mm long over all, creamy-white; *limb* 1,2 mm broad orbicular; *claw* 1,1 mm broad, narrowing to the base, strongly crisped bearded and ciliate. *Staminodes* completely absent. *Filaments* five, becoming 6 mm long, acicular, glabrous. *Anthers* five, before anthesis 1,2 mm long, 0,6 mm broad, cream-coloured, pinkish above; apical gland minute, globose. *Pollen* 45 μ long, 23 μ broad, oblong. *Disc* closes right over the ovary, dark green, excudes nectar. *Stigma* simple, a red dot at the apex of the style. *Style* becoming 6,6 mm long, terete, glabrous. *Ovary* tri-carpellate, 0,5 mm long, 0,6 mm diam., glabrous. *Fruit* normally 3-carpellate (in a random sample of 87 fruits, 6 had 4 carpels. Of the remaining 3-carpellate fruits, 13 developed all three carpels, 35 developed only two and 33 developed only one carpel) 12,5 mm long overall, glabrous, gland-dotted; *horns* about 4 mm long, spreading at 45°, apex emarginate. *Seed* 6,3 mm long overall including the white aril, 2,1 mm broad, black, matt, mottled.

The type material of *Macrostylis crassifolia* was collected by Carl Zeyher in January (the actual year remains a mystery) on the farm Bergvallei, then belonging to Jacob Engelbrecht, in the Clanwilliam District. Duplicates were subsequently distributed to many herbaria. In the case of Sonder's herbarium, which is now divided between Stockholm and Melbourne, duplicates can be found in both herbaria. Of these, that preserved in Stockholm has been chosen as the lectotype. The specimen Drège 7157, without locality, which is the type of Sonder's var. *affinis*, is considered to be conspecific with *Macrostylis crassifolia*.

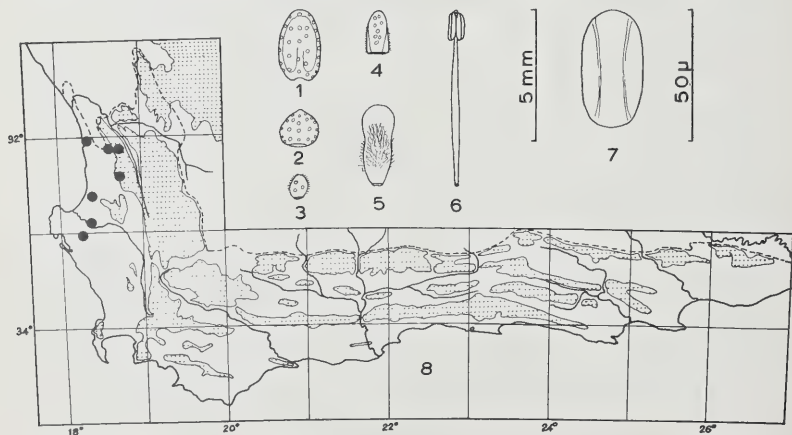


FIG. 7.

Macrostylis crassifolia: 1, leaf. 2, bract. 3, bracteole. 4, calyx lobe. 5, petal. 6, anther. 7, pollen. 8, distribution.

The above description made from fresh material supplements that of Sonder in the *Flora Capensis*.

SPECIMENS EXAMINED

CAPE — 3218 (Clanwilliam): Nortier Reserve, Lamberts Bay (-AB), -/1/1947, *Leipoldt* 4330 (BOL); 3.5 miles E. by N. of Graafwater, Clanwilliam Division (-BA), 1 100 ft., 22/8/1958, *Acocks* 19652 (K); Zeekoevlei (-BA/BB), 24/7/1941, *Esterhuysen* 5614 (BOL); 15 km from Clanwilliam on the Lamberts Bay road, 1 100 ft., 15/8/1973, *Williams* 1851 (NBG), 1852 (NBG); Clanwilliam (-BB), 20/7/1941, *Esterhuysen* 5608 (BOL); Bergvallei, Clanwilliam Division (-BC), -/1/-, *Zeyher* 294 (BM, BOL, G, GOET-WENDL, K, LD, MEL, P, PRE, S, SAM, W); between Bergvallei and Langevallei at Zwartbastkraal, 500 -1 000 ft., 19/11/1828, *Drège* 7154b (G, LD, MEL, P, S); sandy heights at Bergvallei, 500 ft., 9/7/1830, *Drège* 7154a (K, P, W); 4 miles N. of Papkuilsfontein near Aurora, Piketberg Division (-CB), 250 ft., 16/11/1977, *Williams* 2392 (NBG); Piketberg, sandy plains and river, *Niven* 32 (BM); Rhasgat on the Berg River near Kersfontein, Piketberg Division (-CD), -/1/1886, *Bachmann* s.n. (BOL).

— 3318 (Cape Town): 8 miles from Hopefield towards Langebaanweg (-AA), 250 ft., 29/3/1974, *Williams* 1882 (NBG); Hopefield (-AB), -/9/1905, *H. Bolus* s.n. (BOL), 10/12/1946, *Leighton* 2457 (BOL), *Compton* 18925 (BOL, NBG).

Without locality: *Masson* s.n. (BM), *Zeyher* 289 (K, SAM), *Drège* 7157 (K, P, S, W), *Drège* s.n. (MEL, S).

DISTRIBUTION

Macrostylis crassifolia is found growing in dry sandy ground derived from the Table Mountain Sandstone at altitudes of from 30 to 330 metres above sea level, on the coastal plains from near Hopefield in the south to near Graafwater in the north, a distance of about 110 kilometres.

Macrostylis crassifolia is recognised as distinct being a dense shrub 1 m tall with leaves ovate, sessile, gland-dotted all over, with thick margins and thickened at the base.

9. *Macrostylis hirta* E. Mey. ex Sonder in Flor. Cap. 1: 441 (1860). Type: between Bergvallei and Langevallei (at Zwartbastkraal), Clanwilliam Division, 1 000 to 1 500 ft., 19/11/1828, *Drège* s.n. (S, lectotype; MEL, isotype; BM, E, G, K, P, PRE, W, duplicates).

Macrostylis hirta E. Mey in *Drège* Zwei Pflanc. Doc.: 109, 200 (1844) nom. nud. Type: as above.

Macrostylis hirta E. Mey. var. *glabrata* Sond. loc. sit. Type: as above (MEL, S).

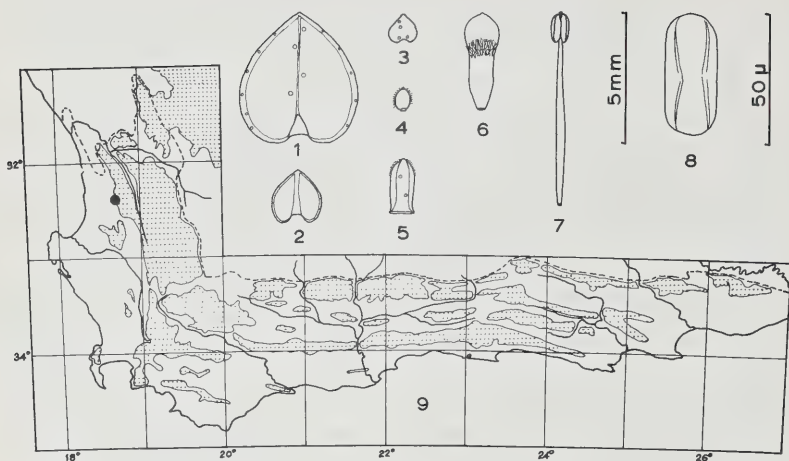


FIG. 8.

Macrostylis hirta: 1, large leaf. 2, small leaf. 3, bract. 4, bracteole. 5, calyx lobe. 6, petal. 7, anther. 8, pollen. 9, distribution.

Macrostylis wallichiana Dümmer in Fedde Repert. **11**: 120 (1912). Type: South Africa, Wallich s.n. (K, lectotype; G, BM, isotypes).

Shrubs up to 0,9 m tall or grazed down to 0,1 m, dense, with many stems arising from ground level. *Branches* glabrous, on vigorous young plants straight, erect and quite long but more usually short, spreading at 45° angles, interlocking. *Branchlets* slender, short, glabrous, spreading at 45°. *Leaves* on vigorous young plants 5 mm long, 4,2 mm broad, on older plants about 2,1 mm long, about 1,9 mm broad, ovate-cordate, sub-acute, sessile, alternate, glabrous, glaucous, flat, fleshy, spreading at 90°, margins eciliate, narrowly cartilagenous, somewhat thick; gland dots few on margins and midrib. *Inflorescence* terminal with flowers sessile, creamy-white, aggregated into groups of up to 7. *Bract* varies, outermost leaf-like, inner 1 mm long, 0,6–1,0 mm broad, sub-orbicular, glabrous, very sparsely ciliate, apex with a blunt point. *Bracteoles* two, 0,8 mm long, 0,6 mm broad, asymmetrically oblong; apex thick with a small obtuse point; midrib thickened; hyaline margins sparsely ciliate. *Calyx lobes* five, 2 mm long, 0,9 mm broad, oblong, obtuse with a small blunt point; margins broadly translucent, minutely ciliate above; adaxial surface minutely pubescent towards the apex; abaxial surface round, keeled, glabrous, obscurely gland-dotted. *Petals* five, 3,7 mm long overall; *limb* 1,7 mm broad, orbicular, obtuse. *Claw* 1 mm broad, very strongly crisped bearded above. *Staminodes* absent. *Filaments* five, becoming 6,3 mm long, straight, glabrous. *Anthers* five, before anthesis 1,1

mm long, 0.7 mm broad, wine-coloured; apical gland minute. Pollen 45 μ long, 20 μ diam., oblong. Disc green, curls over the ovary, exudes nectar. Stigma simple. Style becoming 7.5 mm long, straight, terete, glabrous, narrower below. Ovary 3-carpellate, 0.6 mm diam., glabrous. Fruit 3-carpellate, usually with one developing to maturity, 9.5 mm long overall, glabrous, gland-dotted, sometimes reddened; horn 3 mm long, fairly erect, apex bifid. Seed 5.5 mm long, including the aril 1 mm long, 1.8 mm broad, black, matt, mottled; aril white.

Drège collected this species on the 19th November 1828, according to a fully labelled specimen preserved in Paris, on the farm Swartbaskraal in the Clanwilliam Division. Sonder recognised that some plants may be more glabrous than others by proposing the variety *glabrata* at the same time as he validated *E. Meyer*'s manuscript name *hirta*. Later Dümmer proposed the name *M. wallichiana* based on a rather glabrous specimen collected by Wallich at the Cape. This variation in pubescence not being thought to be a character worthy of recognition, *M. hirta* var. *glabrata* and *M. wallichiana* are both considered to be conspecific with *M. hirta* E. Mey. ex Sond. The above description of the glabrous form made from fresh material (Williams 1849) amplifies that of Sonder in the *Flora Capensis* (1860).

SPECIMENS EXAMINED

CAPE—3218 (Clanwilliam): between Bergvallei and Langevallei (at Zwartbaskraal), Clanwilliam Division (–BC), 1 000–1 500 ft. (111. E. a, 12), 19/11/1828, Drège s.n. (MEL, S, BM, E, G, K, P 1879, PRE, W); south end of Boekenberg, Swartbaskraal, 1 400 ft., 15/8/1973, Williams 1849 (NBG); 2 km south of Bo-Swartberg on road from Bergvallei (–BD), 1 700 ft., 11/7/1975, Williams 2013 (NBG).

Without locality: Cap. B. Spei., Wallich s.n. (K, G, S).

Macrostylis hirta is recognised as distinct having leaves ovate, cordate, sub-acute, spreading at right angles to the stem, fairly flat and not recurved as in *M. squarrosa* and in having the stigma simple, the calyx 2.5 mm long with the lobes glabrous.

10. *Macrostylis barbiger* (Linn. F.) Bartl. & Wendl. Diosmeae in Beitr. Bot. 1: 195 (1824).

Diosma barbiger Linn. f. Suppl. Plant.: 155 (1781). Type: Swartland, Thunberg s.n. (LINN 270/19, holotype; C. S. UPS–THUNB 5659, isotypes)

Shrubs about 0.3 m tall, fairly erect, diffuse, single-stemmed at base. Branches short, flexuous, 2–3-chotomous, glabrous, brownish, rough with leaf scars. Branchlets short, slender, glabrous, yellowish, opposite, spreading or sub-erect, well-clothed with leaves. Leaves 6–12 mm long, 4–6.5 mm broad, ovate-cordate, acute, cuspidate, sessile, glabrous, opposite, spreading, pale green

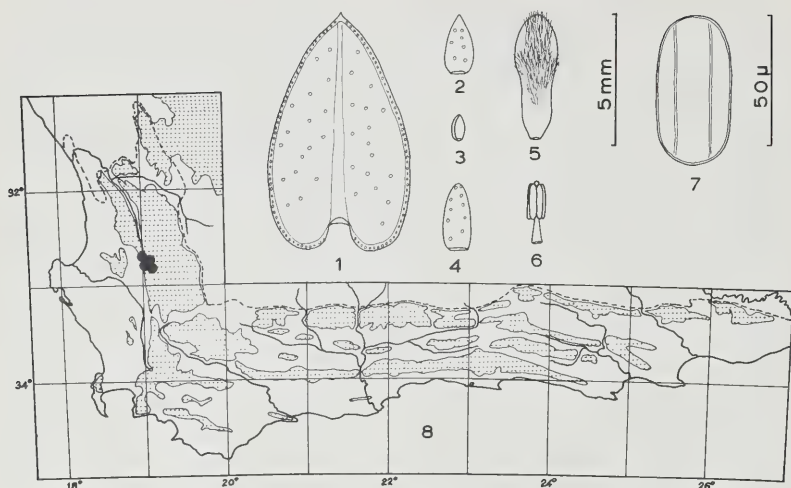


FIG. 9.

Macrostylis barbiger: 1, leaf. 2, bract. 3, bracteole (side view). 4, calyx lobe. 5, petal. 6, anther. 7, pollen. 8, distribution.

above, gland-dotted, glaucous and one-nerved beneath; margins narrowly cartilagenous, minutely gland-dotted. *Inflorescence* terminal, umbellate, in groups of up to 8 arranged in 4 opposite pairs, pendulous with the common peduncle 3–4 mm long deflexed; flowers pedicellate, white. *Bracts* one per floret, the outermost pair 2.2 mm long, 1.1 mm broad, the innermost about 1 mm long, lanceolate, glabrous, glaucous, gland-dotted. *Bracteoles* two, 1–1.3 mm long, oblong, complicate, glabrous at base of pedicel. *Pedicel* about 3.5 mm long, narrowing to the base, white, glabrous. *Calyx lobes* five, 2.5 mm long, 1.1 mm broad, oblong, obtuse, glabrous, gland-dotted, whitish. *Petals* five, 4.7 mm long overall, eciliate, densely bearded with shaggy hairs mainly on the midrib about the middle, the hairs projecting upwards from the throat of the flower; *limb* 1.7 mm broad, ovate; *claw* 1.1 mm broad. *Staminodes* vestigial, a minute gland 0.05 mm diam. at the apex of a filament 0.2 mm long. *Filaments* five, becoming 7.5 mm long, glabrous, terete. *Anthers* five, 1.3 mm long, 0.7 mm broad, orange-coloured; apical gland 0.15 mm diam., globose. *Pollen* 58 μ long, 28 μ diam., oblong. *Disc* closes over the ovary at first, dark green, exudes nectar. *Stigma* 0.3 mm diam., obtuse. *Style* becoming 9 mm long, terete, glabrous, very slightly narrower below. *Ovary* 3-carpellate, 0.7 mm diam., glabrous. *Fruit* 3-carpellate, of which one, two or three may develop, pedicellate, style persisting; *carpel* 10–12 mm long overall, glabrous, green; *horn* 3 mm long, erect, incurved. *Seed*

6.4 mm long (7.6 mm long overall including the white aril), 2.5 mm broad, black, matt, mottled.

In September 1773 C. P. Thunberg, accompanied by Francis Masson, traversed the Cardouw Pass across the mountains which divide the Swartland from the Olifants River Valley. There can be no doubt that it was here that he collected the type material of *Macrostylis barbiger*; it was here also that Zeyher made his collection of this species that was distributed to many herbaria. The above description, made from fresh material, supplements those of previous authors.

SPECIMENS EXAMINED

CAPE—3219 (Wupperthal): slopes of Olifants River Mtns. near Warmbaths, Clanwilliam Division (—CA), 25/9/1911, *Stephens 7115* (BOL, GRA, K), *Stephens 7118* (BM, GRA, K), *Pearson 7115* (SAM), 2 000 ft., 8/7/1935, *Compton 5370* (BOL, NBG); Swartland (—CC), *Thunberg s.n.* (LINN 270.19, C, S, UPS—THUNB. 5659); in monte Kardouw, 1 500–2 000 ft., —/12/—, *Zeyher 295* (BM, C, E, G, GRA, K, MEL, P, PRE, S, SAM, W), *Hesse s.n.* (GOET); Cardouw Pass, Clanwilliam Division, 4/11/1951, *Maguire 1212* (NBG); Dasklip Pass near summit E. side, 2 400–2 600 ft., 6/10/1971, *Williams 1547* (NBG), 2 150 ft., 24/1/1973, *Williams 1747* (NBG), 2 000 ft., 7/11/1974, *Williams 1915* (NBG); hills a mile S.E. of Keerom, Clanwilliam Division, 25/11/1938, *Pillans 8705* (BOL, K); W. slopes of Cold Bokkeveld Mtns. above Olifants River Valley, 4/12/1950, *Esterhuysen 17923* (BOL); W. slopes below Olifants River Dome, 3 000 ft., 16/4/1949, *Esterhuysen 15307* (BOL); Onderboskloof, rocky slopes in upper Olifants River Valley, Ceres Division, 25/12/1947, *Esterhuysen 14311* (BOL, BM); Porterville, Piketberg Division, —/12/1956, *Loubser 808* (BOL).

Without locality: *Scholl 1118* (W), *Scholl 426* (W), *Edwards 6474* (SAM), *Edwards 262* (BOL), *Millar s.n.* (BM), *Masson s.n.* (BM), *Banks s.n.* (C), *Herb. Burmann s.n.* (G).

DISTRIBUTION

Macrostylis barbiger is not a rare plant and yet it has a strictly limited distribution being confined to the mountains on either side of the upper Olifants River, at heights lying between 600 and 900 metres above sea level. Its known range is about 12 km from east to west by about 20 km from north to south. The plants grow on dry, hard, stony or rocky ground derived from the Table Mountain Sandstone.

Macrostylis barbiger is recognised as distinct being completely glabrous with large ovate-cordate opposite leaves and with pendulous, umbellate flowers.

PUTATIVE HYBRIDS

M. barbiger is the only species in the genus possessing opposite leaves. Consequently, when a small population of *Macrostylis* plants with opposite leaves was discovered on the east side of Dasklip Pass it immediately excited attention. Unlike *M. Barbiger*, which has leaves cordate and glaucous, these specimens possessed leaves that are lanceolate and not at all glaucous.

There appears to be a distinct possibility that these plants are the result of hybridisation between *M. barbiger* and *M. decipiens* both of which occur in this area. Miss E. Esterhuysen has made a similar hybrid collection from Onderboskloof about 13 km to the east. In this case *M. barbiger* and *M. tenuis* are both found in the vicinity.

SPECIMENS EXAMINED

CAPE—3219 (Wupperthal): East side of Dasklip Pass on road to Grootfontein, Clanwilliam Division (—CC), 2 200 ft., 23/9/1974, *Williams 1884* (NBG), 7/11/1974, *Williams 1914* (NBG); Onderboskloof, rocky slopes in upper Olifants River Valley, 2/1/1948, *Esterhuysen 14292 ex parte* (BOL).

SPECIES EXCLUDED

Macrostylis cordata G. Don Gen. Syst. 1: 789 (1831) = *Agathosma imbricata* Willd.

Macrostylis patersoniae Schonland in Trans. R. Soc. S. Afr. 1: 445 (1910) = *Acmadenia obtusata* (Thunb.) B. & W.

PHYTOGEOGRAPHY

Eight of the ten species of *Macrostylis* are found in the Clanwilliam Division. Of the remaining two, *M. villosa* is found on the Cape Peninsula, on the adjacent Cape Flats and on the West Coastal Plain while the other, *M. cauliflora*, is found in the Bredasdorp District—a disjunction of about 135 km to the east. Most species are found growing in sandy places amongst quartzitic rocks of the Table Mountain Geological Series. Three species *M. villosa*, *M. decipiens* and *M. crassifolia* appear to be able to withstand fires by coppicing from the root. Of these *M. villosa* and *M. crassifolia* are specially adapted to the sandy coastal plains having a very stout tap root penetrating deep into the sand. They appear to be unaffected by the moles which are abundant in these areas.

The one species with a large disjunction in its distribution pattern is *M. cassiopoides* where *M. cassiopoides* subsp. *dregeana* is found 112 km to the south of the nearest population of the typical subspecies. It is evident that these populations have been separated for long enough to be recognised at subspecific level. *M. tenuis* is a particularly variable species and also has the most widespread distribution both in altitude and distance. It is found as far north as the Giftberg

near Vanrhynsdorp and throughout the Cedarberg and Cold Bokkeveld mountains as far south as the Hex River Valley.

M. squarrosa shows a compact distribution in the vicinity of Clanwilliam with outliers on the Bokkeveld Mountains about 70 km away in the Calvinia Division.

Of fairly limited distribution are *M. ramulosa*, *M. cauliflora*, *M. hirta* and *M. barbiger*. *M. decipiens* is found on the mountains from Citrusdal to Ceres and on the Piketberg, an "island" of T.M.S. separated from the main north-south mountain ranges by a distance of 22 km. In this case one can only speculate that it must have been a very long time since these populations migrated to their present positions.